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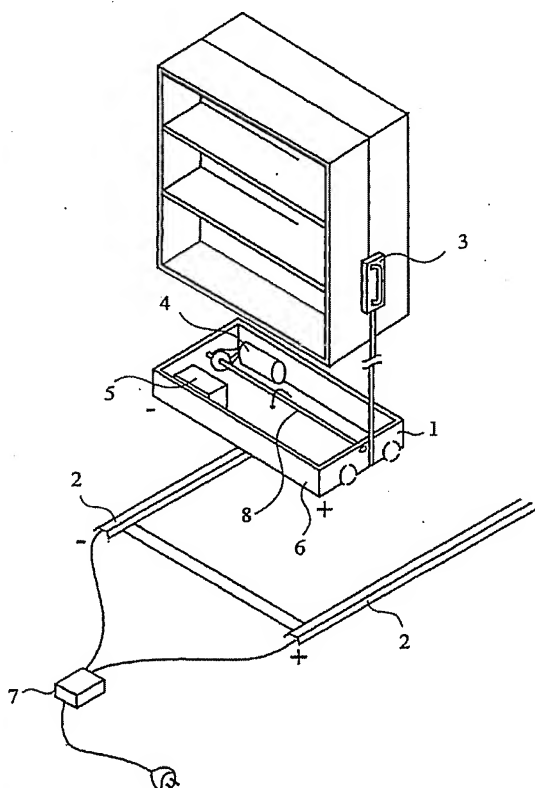
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(54) Title: **MOTORISED COMPACT STORE**



(57) Abstract: The present invention relates to a motorised compact store comprising a plurality of trucks (1), rails (2) for track-bound movement of the plurality of trucks and members (3) for activating said movement. Each truck comprises a motor (4) for executing the movement of the truck. Further, each truck comprises an electric accumulator (5) for driving the motor. The rails are connected to a power supply unit of the low voltage type, each truck comprising current-receiving contact members for receiving charge current from the rails for charging the respective accumulator. Further, each truck preferably comprises sensor and control members for providing automatic mutual controlling and movement of all the trucks.

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Published:

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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MOTORISED COMPACT STORE

FIELD OF THE INVENTION

- 5 The present invention relates to a compact store. The invention relates especially to a motorised compact store.

PRIOR ART

10

- In order to utilise storage spaces effectively, displaceable shelf systems, so-called compact shelves or compact stores, are usually used, for example in offices, libraries, record offices and store rooms. An example of
15 a truck comprising a shelf in just such a displaceable shelving system is shown in Fig. 1. In order to make it easier for a user to move the trucks in a compact store, the shelving system can also be motorised.

- 20 Drawbacks of currently found systems of motorised compact stores are, inter alia, that they are electrically powered with 220 V via cables for supplying power to the motor, in which the cables lie externally to the trucks in a variety of ways.

25

BRIEF SUMMARY OF THE INVENTION

- An object of the present invention is to provide a motorised compact store which does not have cables
30 externally to the trucks of the compact store.

- The present invention is based on the insight that the aforementioned object can be achieved by means of a compact store which, in each truck, comprises a motor and
35 an electric accumulator for driving the motor.

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The specific characteristics of a motorised compact store according to the present invention can be ascertained from patent claim 1.

5 An advantage with a motorised compact store configured according to the present invention is that the trucks in the compact store do not need connecting cables to supply power to the motors.

10 Further characteristics and advantages of the present invention will be ascertained from the following description and subsequent patent claims.

The invention will be described in greater detail below
15 with reference to the detailed description of embodiments and the accompanying figures, which merely illustrate and thus do not limit the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

20

Figure 1 shows a truck in a compact store according to the prior art, and

Figure 2 shows an exploded diagram of a motorised truck
25 in a compact store according to the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

In the following description, specific details, such as
30 particular techniques and applications, are given for explanatory and non-limiting purposes in order to achieve a thorough understanding of the present invention. It will be clear to a person skilled in the art, however, that the present invention can be realised in other
35 embodiments which differ from these specific details. In other examples, a detailed description of well-known

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methods and devices is omitted so as not to obscure the description of the present invention with unnecessary details.

- 5 A first embodiment of the present invention will now be described with reference to Fig. 2.

10 A compact store comprises a plurality of trucks 1 which, track-bound, are movable on a pair of rails 2. Each truck 1 comprises wheels for movement of the truck 1 on the rails 2, shelves or the like for stock-keeping, a motor 4, coupled to a drive shaft 8, for moving the truck 1 and a battery 5 for driving the motor 4. Since the current for driving the motor 4 comes from inside the truck 1,
15 i.e. from the battery 5, no cabling is required outside the truck 1.

Activation of the motor 4 and hence movement of the truck 1 can be provided in a number of different ways.

20 Each truck 1 can have a handle with circuit breaker 3 for movement of the truck 1 to the left and right. The truck can transport itself under its own power, together with other trucks which need to be moved. Alternatively, the truck can send control signals to other trucks so that
25 the truck located adjacent to an empty space to be filled moves first and, after this, one truck at a time is moved until the desired corridor is freed. Preferably, the signal traffic is sent by wireless transmission between
30 the trucks, so that there is no need for wiring between the trucks, or else the signal traffic is sent via the rails and the wheels. The wireless connection can be realised, for example, via IR or radio.

35 A central panel can be present, which indicates the corridor which is required to be entered, i.e. the

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shelves between which access is sought. In this case, too, a truck can receive an activation signal and hence required trucks can be moved under its own power, or alternatively one truck is moved at a time, refilling the
5 respective empty space. Preferably, this signalling is also realised in a wireless manner. The central panel can be provided, for example, as a remote control.

A central controlling of the compact store can
10 advantageously be combined with software, which, for example, in the event of a search hit in a register, automatically opens the right corridor for accessing the sought material according to any of the above-described methods for clearing corridors between shelves.

15

A system in which the motor in a truck is used to move a plurality of trucks at once has a greater inertia than a system in which each truck moves under its own power. The less inertia which is present in the system, the quicker
20 the trucks can be stopped, which means that it is advantageous to use a system in which each truck moves under its own power.

A central panel can, of course, be combined with an
25 activation member on each truck. The activation member on each truck can alternatively also comprise a panel for opening all the corridors, one corridor at a time.

The compact store is powered by low voltage, for example
30 12 V or 24 V, which is fed via the rails to the trucks. A transformer 7 is used to convert ordinary mains voltage into the low voltage which is applied to the rails. The current is received in the trucks, for example via the wheels or via a purpose-built collector shoe system for
35 charging the batteries in the trucks. Drive power to the trucks is thereby obtained without the need for external

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cables, since the low voltage is divided between the two rails.

Preferably, the battery in each truck is only charged
5 when the truck is stationary. Uneven voltage levels and
any sparking which might arise if the charging is carried
out whilst the truck is in motion are thereby avoided. If
the charge current varies, the drive current from the
10 battery to the motor is also in danger of varying, which
is not desirable. Each battery preferably has a control
system which controls the charging. In addition, a
central control system can be present, which, for
example, only applies voltage to the rails when some
battery is in need of charging.

15 Charging faults in a battery are indicated, for example,
with a light-emitting diode on the respective truck,
alternatively with a light-emitting diode on a central
panel indicating the truck whose battery has a charging
20 fault.

In order to achieve the above-described movement of the
trucks automatically, break strips, for example, are
provided on the trucks. A sensor is thereby provided, for
25 example break contacts against the next truck 6, which
indicates whether there is free space beside a truck,
i.e. whether the shelves are accessible or not.

A second embodiment of the present invention will next be
30 described, this too with reference to Fig. 2. This
embodiment is identical with the first embodiment
described above, apart from the following differences.

A compact store according to this second embodiment
35 additionally comprises sensors for preventing jamming
between shelves. Such a sensor interrupts the current to

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the motor in the truck in which the sensor is situated. In addition, an emergency stop signal can be sent to other trucks, so that the current to their respective motors is interrupted.

5

The above-described break strips can be used as sensors for jamming protection. Alternatively, the sensors for jamming protection can be provided in addition to the break strips, for example in the form of an optic
10 detector or a mechanical contact breaker.

In case of automatic movement of the trucks, either one truck can move at a time, or else each truck which is to be moved can move as fast as the break strips and the
15 jamming sensors allow. If a plurality of trucks are allowed to move simultaneously, an emergency stop, i.e. interruption of the motor current as the result of an emergency stop signal from a jamming sensor, should stop all moving trucks for safety reasons.

20

Preferably, a movement of a truck is activated with the aid of pulse control, i.e. a corridor is opened regardless of whether the circuit breaker is released or not, but is stopped if a jamming sensor emits an
25 emergency stop signal.

It is clear that the present invention can be varied in a number of ways. Such variations should not be regarded as deviation from the scope of the present invention. All
30 such variations which are obvious to a person skilled in the art are meant to be included within the scope of the present invention.

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PATENT CLAIMS

1. A motorised compact store comprising a plurality of trucks (1), rails (2) for track-bound movement of the
5 said plurality of trucks and members (3) for activating the said movement, in which each truck comprises a motor (4) for executing the said movement and an electric accumulator (5) for driving the said motor, characterised in that the said rails are connected to a power supply
10 unit of the low voltage type, each truck comprising current-receiving contact members for receiving charge current from the said rails for charging the respective accumulator.
2. The motorised compact store as claimed in claim 1,
15 in which the wheels of the truck are used as the said current-receiving contact members.
3. The motorised compact store as claimed in claim 1, in which the said current-receiving contact members are designed as a collector shoe system.
- 20 4. The motorised compact store as claimed in any of the above claims, in which control signals for activating the said movement are transmitted in a wireless manner between the said plurality of trucks.
5. The motorised compact store as claimed in any of the
25 above claims, in which each truck comprises sensor members (6) and control members for providing automatic mutual controlling and movement of the said plurality of trucks.
6. The motorised compact store as claimed in any of the
30 above claims, in which each accumulator is designed to be charged when the respective truck is stationary.
7. The motorised compact store as claimed in any of the above claims, in which each truck comprises safety cut-outs for stopping movement by interrupting the motor
35 current.

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8. The motorised compact store as claimed in claim 7, in which the said safety cut-out comprises break strips for detecting obstacles in the direction of movement.

9. The motorised compact store as claimed in claim 7 or
5 8, in which interruption of the motor current in a truck gives a signal which interrupts the motor current in all trucks.

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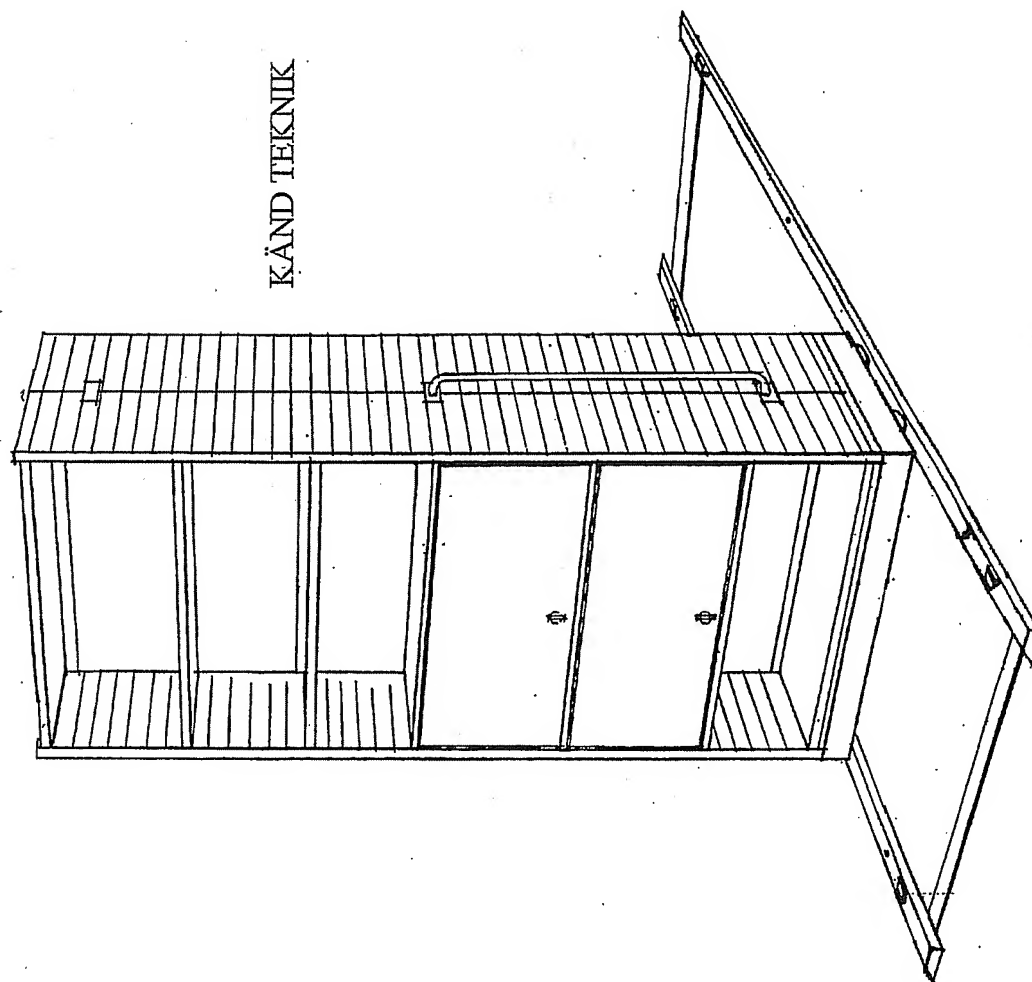


FIG. 1

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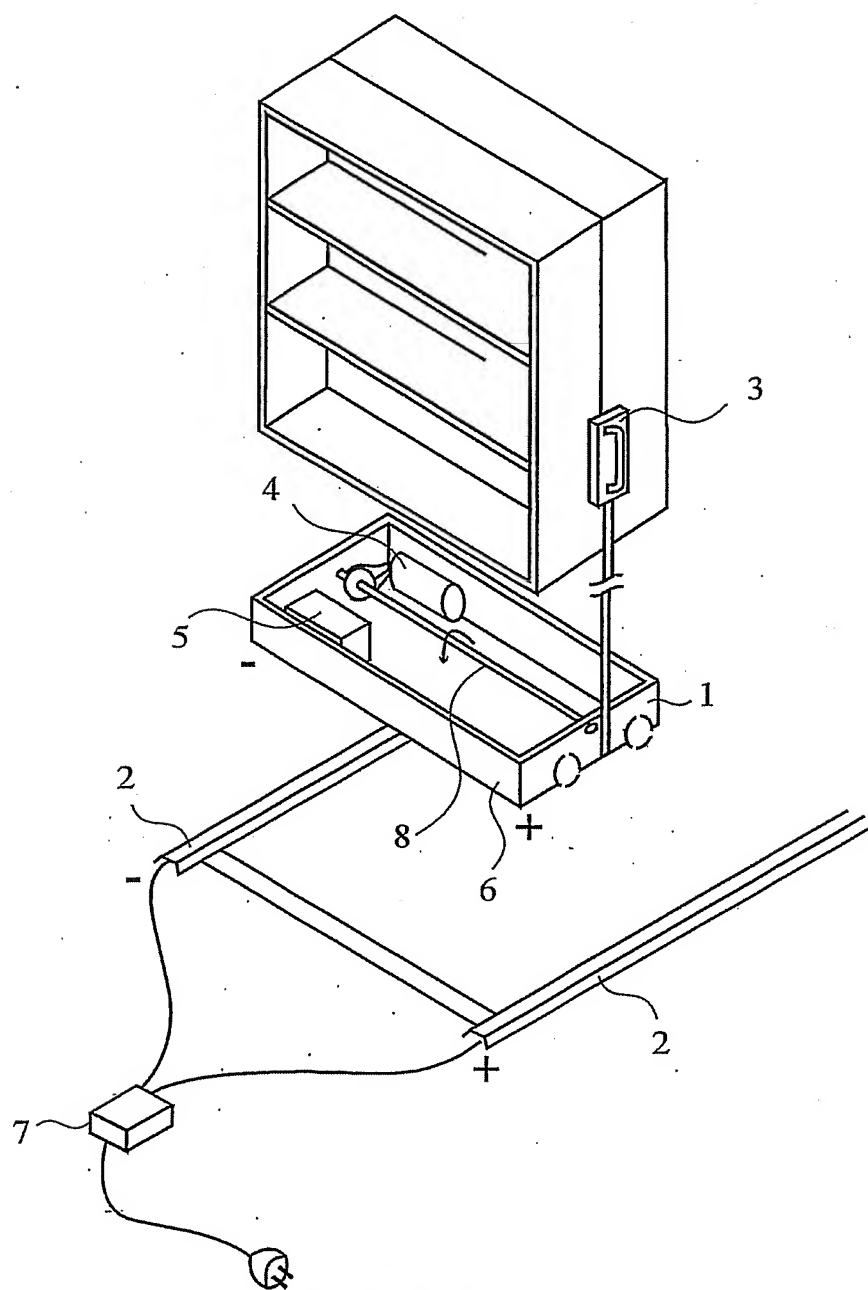


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 03/00738

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65G 1/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001340148 A (OKAMURA MFG CO LTD), 11 December 2001 (11.12.01)	1-9
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A	JP 10265012 A (OKAMURA MFG CO LTD), 6 October 1998 (06.10.98)	1-9
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☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

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Patent document cited in search report			Publication date	Patent family member(s)	Publication date
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